

Listing of Claims

Claim 1(original): A polymer based micro-machine formed by the steps comprising:

- a. forming a mold of a design through a lithography process;
- b. transferring said design to a polymer substrate through a hot embossing process;
- c. depositing a metal layer over at least part of said design; and
- d. connecting at least one electrical lead to said metal layer.

Claim 2(original): The polymer based micro-machine according to claim 1, wherein said design is a structure for a tunneling current sensor.

Claim 3(original): The polymer based micro-machine according to claim 1, further including the step of forming two separate polymer substrates and adhering said separate substrates together.

Claim 4(original): The polymer based micro-machine according to claim 3, further including the step of back etching at least one of said polymer substrates.

Claim 5(original): The polymer based micro-machine according to claim 1, wherein said step of transferring said design includes using PMMA as the polymer substrate.

Claim 6(original): The polymer based micro-machine according to claim 1, wherein said metal layer is deposited over substantially all of a surface containing said design and is etched to conform to said design.

Claim 7(original): The polymer based micro-machine according to claim 2, wherein said design structure is a comb drive.

Claim 8(original): The polymer based micro-machine according to claim 1, wherein two molds are formed with each of said molds forming a separate polymer substrate.

Claim 9(original): The polymer based micro-machine according to claim 8, wherein said separate polymer substrates are metalized and bonded together.

Claim 10(withdrawn): A polymer based micro-machine comprising:

- a. a polymer substrate having a polymer micro-structure formed thereon;
- b. a metal layer over at least part of said micro-structure; and
- c. at least one electrical lead connected to said metal layer.

Claim 11(withdrawn): The polymer based micro-machine according to claim 10, wherein said micro-structure is a structure for a tunneling current sensor.

Claim 12(withdrawn): The polymer based micro-machine according to claim 10, wherein said substrate and micro-structure are formed of PMMA.

Claim 13(withdrawn): The polymer based micro-machine according to claim 11, wherein micro-structure is a comb-drive.

Claim 14(withdrawn): The polymer based micro-machine according to claim 10, wherein said micro-structure further comprises two polymer sections having metal formed thereon and said two polymer sections being bonded together.

Claim 15(withdrawn): A reduced noise tunneling sensor comprising:

- a. a first proof mass influencing a first tunneling tip;
 - b. a second proof mass having substantially the same mass as said first proof mass;
 - c. said second proof mass influencing a second tunneling tip;
 - d. an indifference circuit receiving a first signal related to movement of said first proof mass and a second signal related to movement of said second proof mass;
- and

e. wherein said first and second signals have a useful signal component and a noise component and said indifference circuit subtracts said first and second signals, thereby doubling said useful signal component and eliminating said noise component.

Claim 16(withdrawn): The reduced noise tunneling sensor of claim 15, wherein a base structure of said tunneling sensor is formed of a polymer material.

Claim 17(withdrawn): The polymer based micro-machine according to claim 15, wherein said substrate and micro-structure are formed of PMMA.

Claim 18(withdrawn): The polymer based micro-machine according to claim 15, wherein micro-structure is a comb-drive.